What is claimed is:

1. A droplet ejector, comprising:

a fluid path through which a fluid moves, a nozzle being formed on one end of the fluid path;

a volumetric structure formed in the fluid path, the volumetric structure being sensitive to an external stimulus and being capable of varying in size to eject a droplet of the fluid through the nozzle; and

a stimulus generator, which applies a stimulus to the volumetric structure to vary a size of the volumetric structure.

2. The droplet ejector as claimed in claim 1, wherein the volumetric structure expands in size to eject the droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to expand the size of the volumetric structure.

3. The droplet ejector as claimed in claim 2, wherein the volumetric structure is formed of stimulus sensitive hydrogel.

4. The droplet ejector as claimed in claim 3, wherein the stimulus sensitive hydrogel is electrical field sensitive hydrogel.

5. The droplet ejector as claimed in claim 4, wherein the fluid path comprises:

a chamber, which is filled with the fluid to be ejected and is formed under the nozzle; and

a channel for supplying the fluid to the chamber,

wherein the volumetric structure is formed in the chamber.

6. The droplet ejector as claimed in claim 5, wherein the volumetric structure has a columnar shape, a hexahedral shape, or a cylindrical shape.

7. The droplet ejector as claimed in claim 5, wherein the stimulus generator is a pair of electrodes respectively disposed above and below the volumetric structure.

8. The droplet ejector as claimed in claim 7, wherein one of the pair of electrodes is a cathode and is disposed above the volumetric structure.

9. The droplet ejector as claimed in claim 5, wherein the stimulus generator is a pair of electrodes respectively disposed at either side of the volumetric structure.

10. The droplet ejector as claimed in claim 1, wherein the volumetric structure contracts in size to eject the droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to contract the size of the volumetric structure.

11. The droplet ejector as claimed in claim 10, wherein the volumetric structure is formed of stimulus sensitive hydrogel.

12. The droplet ejector as claimed in claim 11, wherein the stimulus sensitive hydrogel is temperature sensitive hydrogel.

13. The droplet ejector as claimed in claim 12, wherein the stimulus generator is a resistance heating material for applying heat to the volumetric structure.

14. The droplet ejector as claimed in claim 13, wherein the fluid path comprises:

a chamber, which is filled with the fluid to be ejected and is formed under the nozzle; and

a channel for supplying the fluid to the chamber.

15. The droplet ejector as claimed in claim 14, wherein the volumetric structure is formed in the channel.

16. The droplet ejector as claimed in claim 15, wherein the volumetric structure has a columnar shape or a hexahedral shape.

17. The droplet ejector as claimed in claim 14, wherein the volumetric structure is formed in the nozzle.

18. The droplet ejector as claimed in claim 14, wherein the volumetric structure is formed in the chamber.

19. An ink-jet printhead, comprising:

a substrate on which a manifold for supplying ink is formed;

a barrier layer, which is stacked on the substrate and on which an ink chamber to be filled with ink to be ejected and an ink channel for providing communication between the ink chamber and the manifold are formed;

a nozzle plate, which is stacked on the barrier layer and in which a nozzle, through which an ink droplet is ejected, is formed;

a volumetric structure, which is formed in a position where ink moves, the volumetric structure being sensitive to an external stimulus and being capable of varying in size to eject the ink droplet through the nozzle; and

a stimulus generator, which applies a stimulus to the volumetric structure to vary a size of the volumetric structure.

20. The ink-jet printhead as claimed in claim 19, wherein the volumetric structure expands in size to eject the ink droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to expand the size of the volumetric structure.

21. The ink-jet printhead as claimed in claim 20, wherein the volumetric structure is formed of stimulus sensitive hydrogel.

22. The ink-jet printhead as claimed in claim 21, wherein the stimulus sensitive hydrogel is electrical field sensitive hydrogel.

23. The ink-jet printhead as claimed in claim 22, wherein the volumetric structure is formed in the ink chamber.

24. The ink-jet printhead as claimed in claim 23, wherein the volumetric structure has a columnar shape, a hexahedral shape, or a cylindrical shape.

25. The ink-jet printhead as claimed in claim 23, wherein the stimulus generator is a pair of electrodes respectively disposed above and below the volumetric structure.

26. The ink-jet printhead as claimed in claim 25, wherein one of the pair of electrodes is a cathode and is disposed above the volumetric structure.

27. The ink-jet printhead as claimed in claim 23, wherein the stimulus generator is a pair of electrodes respectively disposed at either side of the volumetric structure.

28. The ink-jet printhead as claimed in claim 19, wherein the volumetric structure contracts in size to eject the ink droplet through the nozzle, and the stimulus generator applies the stimulus to the volumetric structure to contract the size of the volumetric structure.

29. The ink-jet printhead as claimed in claim 28, wherein the volumetric structure is formed of stimulus sensitive hydrogel.

30. The ink-jet printhead as claimed in claim 29, wherein the stimulus sensitive hydrogel is temperature sensitive hydrogel.

31. The ink-jet printhead as claimed in claim 30, wherein the stimulus generator is a resistance heating material for applying heat to the volumetric structure.

32. The ink-jet printhead as claimed in claim 31, wherein the volumetric structure is formed in the ink channel.

33. The ink-jet printhead as claimed in claim 32, wherein the volumetric structure has a columnar shape or a hexahedral shape.

34. The ink-jet printhead as claimed in claim 31, wherein the volumetric structure is formed in the nozzle.

35. The ink-jet printhead as claimed in claim 31, wherein the volumetric structure is formed in the ink chamber.